ISSN 0031-0301, Paleontological Journal, 2018, Vol. 52, No. 6, pp. 639–652. © Pleiades Publishing, Ltd., 2018.
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Amphibians of the Permian Sundyr Tetrapod Assemblage of Eastern Europe

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Received December 29, 2017

Abstract—Amphibian remains from Sundyr-1 (Russia, Mari El Republic), the reference locality of the Sundyr Tetrapod Assemblage, are identified and described. The assemblage is assigned to the lower Upper Severodvinian Substage (Lower Putyatinian Subhorizon). It is shown that the taxonomic list of the Sundyr-1 locality includes five species, which belong to five genera and four families (Kotlassiidae, Dvinosauridae, Chroniosuchidae, and Enosuchidae). The aquatic tetrapod association of the Sundyr Assemblage occupies an intermediate position between Isheevo and Sokolki tetrapod communities and is mostly composed of genera and species from both of them. Archegosauroid temnospondyls are completely absent; the trophic niche of predominate piscivorous hunter of the community is occupied by the chroniosuchian *Suchonica vladimiri*. Except for the last taxon, amphibians of the Sundyr-1 locality are represented by pedomorphic, constantly aquatic taxa varying in trophic specialization.

Keywords: amphibian community, Sundyr Assemblage, middle Permian, Tatarian, Eastern Europe
DOI: 10.1134/S0031030118060059

INTRODUCTION

In the history of East European tetrapods of the second half of the Permian, two large stages are recognized, i.e., Dinocephalian and Theriodontian (=Pareiasaurian, =Pareiasaurian–Gorgonopian, =Pareiasaurian–Theriodontian) (Fig. 1). These stages were first established by Efremov (1937a, 1937b, 1939, 1941, 1944, 1948, 1952; Efremov and Vjuschkov, 1955). Efremov indicated that Dinocephalian and Pareiasaurian faunas differ significantly; the Dinocephalian fauna is dominated by dinocephalians, whereas in the Pareiasaurian Fauna, they are replaced by pareiasaurs, dicynodonts, therocephalians, cynodonts, and progressive gorgonopians, while dinocephalians have not been recorded. Subsequently, in the East European Platform, many new localities of Permian vertebrates have been discovered and investigated, which allowed detailed elaboration and improvement of the scheme of faunal assemblages and developmental history of the tetrapod fauna (Ivakhnenko, 1990; Ivakhnenko et al., 1997; Golubev, 1999a, 2000a, 2000b). In the Dinocephalian Fauna, the Mezen, Golyusherma, Ocher, and Isheevo assemblages are recognized and, in the Theriodontian Fauna, there are Kotelnich, Ilinskoe, Sokolki, and Vyazniki assemblages. However, distinctions between the Dinocephalian and Theriodontian faunas remain very contrasting. In particular, the late Dinocephalian Fauna (Isheevo Assemblage) and early Theriodontian fauna (Kotelnich and Ilinskoe assemblages) do not share any family (Golubev, 2005).

In opinion of Efremov, the change in faunas was not so sharp. Comparing the evolutionary levels of Permian tetrapods from Eastern Europe and South Africa, he concluded that East European dinocephalians are more primitive than South African ones. In addition, the South African Dinocephalian Fauna includes primitive pareiasaurs, which are completely absent in the Dinocephalian Fauna of Eastern Europe. On the contrary, East European pareiasaurs and gorgonopians from the Pareiasaurian Fauna correspond in evolutionary level to the most advanced South African representatives of these groups, which existed considerably later than dinocephalians had become extinct. Thus, in South Africa, between tetrapod faunas corresponding in evolutionary level to East European Dinocephalian and Pareiasaurian faunas several faunal assemblages are known. On this basis, Efremov concluded that Dinocephalian and Pareiasaurian faunas of Eastern Europe are separated by the long time interval, during which there was a transitional fauna. In his opinion, this transitional fauna has not yet been found, probably because the beds enclosing Dinocephalian and Pareiasaurian faunas are sepa-